

Analysis

To review briefly, Sonehara discloses in Fig. 9A, a planar light emitting device in which a liquid crystal light shutter 6 is disposed above the light guide plate 8. Sonehara's LCD device is configured so that the planar light source provides light for a back light liquid crystal shutter.

The light emitted from the light guide plate 8, therefore, does not form any image; it is merely providing illumination and an image is formed on the liquid crystal light shutter 6 by transmission of the light. Then, the image formed on the shutter 6 is observed directly as a display device on the side opposite to the light guide plate 8.

Not in claim
Accordingly, Sonehara fails to teach a reflection type LCD device, especially a front-lighting LCD device where the light is provided from the observation side of the liquid crystal shutter.

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In contrast to Sonehara, the claimed light source unit is aimed at providing the light to the front-light type LCD. The light source unit is disposed between the observer and the liquid crystal shutter.

Not in claim
The light source unit is required to transmit the image formed on the liquid crystal shutter to the observer, while irradiating the liquid crystal shutter without glare to the observer. Sonehara's light guide plate 8 does not satisfy these requirements of claim 1.

In the rejection the Examiner refers to the "light guide plate 8" as the light pipe having a lower surface, upper surface and incidence side surface. The light guide plate 8 is shown in detail in Figs. 9B and 9C. The Examiner refers to the "light 9" as the light output means of the guide plate. However, the light 9 is merely the light that is emitted from the plate. See col. 7, line 25. There is no suggestion that the light 9 is a light output means, facilitating the function of

making light incident on the incidence side surface exit from the lower surface through the light output means while light incident on the lower surface is transmitted through the upper surface, as recited in claim 1. In fact, light cannot exit from the lower surface due to the jagged structure of the bottom surface of the light guide plate 8. See Figs. 9B and 9C.

allas? { In the present invention, light from the incidence side surface exits from the lower surface and is turned over by the reflection layer to exit from the upper surface in a frontal direction with good directivity (see page 7 of Specification). Moreover, external light can be received and reflected from the reflection layer so as to exit from the upper surface (see page 9 of Specification). Sonehara is not capable of providing this feature due to the structure of the bottom surface of the light guide plate 8.

In addition, Sonehara does not disclose that information light is generated on a lower surface of the light pipe as recited in claim 1. As depicted in Figs. 9B and 9C, light generated from a lower surface of the device (represented by dotted lines) is scattered due to the jagged configuration of the lower surface of the light guide plate 8. Thus, Sonehara is not capable of making an information light under the plate 8 visible through the upper surface. Such an information light would be scattered and mixed. On the other hand, the information light (2) of the present invention is transmitted to exit from the upper surface of the light pipe (see page 20, lines 4-13 and Fig. 1).

Ans. Sonehara In addition, with respect to the length of the linear light source, even though the length of the fluorescent tube 7 is longer than the section of the light guide plate 8, Sonehara is silent about the length of the effective light emission region and non-emission region of the tube 7.

Therefore, the claimed feature that the effective light emission region is longer than the longitudinal length of the incidence side surface cannot be obtained from Sonehara's disclosure.

In view of the foregoing, claim 1 is patentable.

The remaining rejections are directed to the dependent claims. These claims are patentable for at least the same reasons as claim 1, by virtue of their dependency therefrom.

Claim 9 - obvious

In addition, claim 9 further clarifies that the information light is constituted by an image, and this image is visibly transmitted through the upper surface. Due to the configuration of the lower surface of the light guide plate 8 of Sonehara explained above, even though Yamamoto discloses a liquid crystal cell, providing this element under the plate 8 would not have been obvious due to the particular configuration of the plate 8 discussed above. That is, any images would be scattered and would not be visible if they were transmitted through the bottom surface of the plate 8. Altering this configuration would render Sonehara unable to perform its intended function of reflecting the light at its boundary surface (see col. 7, lines 9-30).

Still further, Applicant submits that the external light flux in Sonehara (broken arrow in Figs. 9B and 9C) is transmitted through the transparent light guide plate and thereby it becomes possible to get the external light effectively (column 7, lines 5-8).

This description indicates that the light guide plate is configured so as to incorporate the external light merely as energy for illumination. There is no teaching to transmit visible information light (image). Especially, as shown in Fig. 9C, since the low surface has irregularity, the light incident on the lower face is scattered and the image cannot be transmitted in visible form.

Moreover, if the transmission light is incident on the inclined surfaces for outputting the light on the reflection type liquid crystal shutter (in the present invention, inclined 30-45° with respect to the reference plane), the incident light is refracted considerably or total reflection arises so that the information light can not be emitted from the output surface.

Specifically, as clearly shown in Fig. 9B, the prismatic structure on the lower face does not have a flat portion with respect to the reference plane of the light guide plate. Inclined surfaces are repeated on the lower face. Therefore, the light guide plate of Fig. 9B is not directed to transmit the light from the lower side so as to form information, such as an image.

Thus, the present invention could not be accomplished, even if the references were combined. Therefore, claim 9 is patentable for at least these additional reasons.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Request for Reconsideration Under 37 C.F.R. §1.111
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